

What is claimed is:

1 1. A temperature estimation apparatus, comprising:
 2 state detection means for detecting a value of a
 3 state variable which correlates with a temperature of a
 4 part to have its temperature detected;
 5 memory means for prestoring therein correspondence
 6 information which indicate corresponding relations between
 7 detected results of said state detection means and
 8 temperatures of the part for the temperature detection; and
 9 estimation means for estimating the temperature of
 10 said part for said temperature detection by referring to
 11 the correspondence information on the basis of the detected
 12 result of said state detection means.

1 2. A temperature estimation apparatus as defined in
 2 claim 1, wherein:

3 said part for said temperature detection is a
 4 catalyst which cleans exhaust gas of an engine; and

5 said state variable includes at least one member
 6 which is selected from the group consisting of a quantity
 7 of intake air, a quantity of fuel injection and r. p. m.
 8 (revolutions per minute) of the engine.

1 3. A method of estimating a temperature of a
 2 catalyst, comprising the steps of:

3 ^{Cont Sub p1} prestoring corresponding relations between
 4 temperatures of the catalyst which cleans exhaust gas of an
 5 engine and values of a state variable which correlates with
 6 the temperatures of said catalyst; and

7 detecting an actual value of the state variable,
 8 and then comparing the detected value with the stored
 9 corresponding relations, thereby estimating the temperature
 10 of said catalyst.

11 4. A catalyst-deterioration diagnostic system for
 12 diagnosing a deterioration state of a catalyst, comprising:

13 index means for obtaining a value of an index
 14 which is used for deciding the deterioration state of the
 15 catalyst;

16 catalyst state estimation means for estimating a
 17 state of said catalyst at a time at which said index means
 18 has obtained the index value, as to a physical quantity
 19 which affects a catalytic action of said catalyst;

20 correction means for correcting said index value
 21 obtained by said index means, to a value in a standard
 22 state of said catalyst previously set as to the physical
 23 quantity, by the use of the estimated result of said
 24 catalyst state estimation means; and

25 decision means endowed with a preset criterion
 26 value, and for deciding said deterioration state of said

17 catalyst by comparing the index value corrected by said
18 correction means, with the criterion value.

1 5. A catalyst-deterioration diagnostic system for
2 diagnosing a deterioration state of a catalyst, comprising:

3 index means for obtaining a value of an index
4 which is used for deciding the deterioration state of the
5 catalyst;

6 decision means endowed with a preset criterion
7 value, and for deciding said deterioration state of said
8 catalyst by comparing the index value obtained by said
9 index means, with the criterion value;

10 catalyst state estimation means for estimating a
11 state of said catalyst at a time at which said index means
12 has obtained said index value, as to a physical quantity
13 which affects a catalytic action of said catalyst; and

14 suspension means endowed with a predetermined
15 range concerning the physical quantity, and for causing
16 said decision means to suspend the decision on condition
17 that a value of said physical quantity obtained by said
18 catalyst state estimation means is outside the
19 predetermined range.

1 Sub 6. A catalyst-deterioration diagnostic system for
2 diagnosing a deterioration state of a catalyst as defined
3 in claim 4, wherein:

4 said catalyst serves to eliminate noxious
5 substances which are contained in exhaust gas of an
6 engine; and

7 said catalyst state estimation means includes;
8 operating-situation detection means for
9 detecting a value of that state variable of the engine
10 which correlates with said physical quantity;

11 memory means for storing therein
12 correspondence information which indicate correlations
13 between values of the state variable and those of said
14 physical quantity; and

15 arithmetic means for determining a value of
16 said physical quantity by referring to the correspondence
17 information on the basis of the detected result of said
18 operating-situation detection means.

1 7.. A catalyst-deterioration diagnostic system for
2 diagnosing a deterioration state of a catalyst as defined
3 in claim 5, wherein:

4 said catalyst serves to eliminate noxious
5 substances which are contained in exhaust gas of an
6 engine; and

7 said catalyst state estimation means includes;
8 operating-situation detection means for
9 detecting a value of that state variable of the engine
10 which correlates with said physical quantity;

memory means for storing therein
correspondence information which indicate correlations
between values of the state variable and those of said
physical quantity; and

arithmetic means for determining a value of
said physical quantity by referring to the correspondence
information on the basis of the detected result of said
operating-situation detection means.

8. A catalyst-deterioration diagnostic system for
diagnosing a deterioration state of a catalyst, wherein the
catalyst serves to eliminate noxious components which are
contained in exhaust gas of an engine; comprising:

index means for obtaining a value of an index
which is used for deciding the deterioration state of said
catalyst;

operating-situation detection means for detecting
a value of that state variable of the engine which
correlates with a physical quantity affecting a catalytic
action of said catalyst;

correction means for correcting the index value
obtained by said index means, to a value in a standard
state of said catalyst previously set as to the physical
quantity, by the use of the detected result of said
operating-situation detection means; and

17 decision means endowed with a preset criterion
18 value, and for deciding said deterioration state of said
19 catalyst by comparing the index value corrected by said
20 correction means, with the criterion value.

1 9. A catalyst-deterioration diagnostic system for
2 diagnosing a deterioration state of a catalyst, wherein the
3 catalyst serves to eliminate noxious components which are
4 contained in exhaust gas of an engine; comprising:

5 index means for obtaining a value of an index
6 which is used for deciding the deterioration state of said
7 catalyst;

8 decision means endowed with a preset criterion
9 value, and for deciding said deterioration state of said
10 catalyst by comparing the index value obtained by said
11 index means, with the criterion value;

12 operating-situation detection means for detecting
13 a value of that state variable of the engine which
14 correlates with a physical quantity affecting a catalytic
15 action of said catalyst; and

16 suspension means endowed with a predetermined
17 range concerning the state variable, and for causing said
18 decision means to suspend the decision on condition that
19 the value of said state variable detected by said
20 operating-situation detection means is outside the
21 predetermined range.

1 10. A catalyst-deterioration diagnostic system as
2 defined in claim 5, further comprising:

3 alarm means for giving an alarm for the suspension
4 of said decision when said decision has been suspended by
5 said suspension means.

1 11. A catalyst-deterioration diagnostic system as
2 defined in claim 9, further comprising:

3 alarm means for giving an alarm for the suspension
4 of said decision when said decision has been suspended by
5 said suspension means.

1 12. A catalyst-deterioration diagnostic system for
2 diagnosing a deterioration state of a catalyst, wherein the
3 catalyst serves to eliminate noxious components which are
4 contained in exhaust gas of an engine; comprising:

5 index means for obtaining a value of an index
6 which reflects the deterioration state of said catalyst;

7 operating-situation detection means for detecting
8 a value of that state variable of the engine which
9 correlates with a physical quantity affecting a catalytic
10 action of said catalyst;

11 correction means for correcting the value
12 detected by said operating-situation detection means, to a
13 value in a standard state of said catalyst previously set

14 as to the index, by the use of the index value obtained by
15 said index means; and

16 decision means endowed with a preset criterion
17 value, and for deciding said deterioration state of said
18 catalyst by comparing the value corrected by said
19 correction means, with the criterion value.

1 13. A catalyst-deterioration diagnostic system as
2 defined in claim 6, wherein:

3 the physical quantity is a temperature of said
4 catalyst; and

5 said state variable includes at least one member
6 which is selected from the group consisting of a quantity
7 of intake air, a quantity of fuel injection and r. p. m.
8 (revolutions per minute) of the engine.

1 14. A catalyst-deterioration diagnostic system as
2 defined in claim 8, wherein:

3 the physical quantity is a temperature of said
4 catalyst; and

5 said state variable includes at least one member
6 which is selected from the group consisting of a quantity
7 of intake air, a quantity of fuel injection and r. p. m.
8 (revolutions per minute) of the engine.

1 15. A catalyst-deterioration diagnostic system as
2 defined in claim 9, wherein:

3 the physical quantity is a temperature of said
4 catalyst; and

5 said state variable includes at least one member
6 which is selected from the group consisting of a quantity
7 of intake air, a quantity of fuel injection and r. p. m.
8 (revolutions per minute) of the engine.

1 16. A catalyst-deterioration diagnostic system as
2 defined in claim 12, wherein:

3 the physical quantity is a temperature of said
4 catalyst; and

5 said state variable includes at least one member
6 which is selected from the group consisting of a quantity
7 of intake air, a quantity of fuel injection and r. p. m.
8 (revolutions per minute) of the engine.

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